PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements relating to Syphonic-Discharge Water-Closet Basins

We, TWYFORDS LIMITED, a British Company, of Cliffe Vale Potteries, Newcastle Road, Hanley, Stoke-on-Trent, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to syphonic-discharge water-closet basins of the kind comprising a bowl communicating with a discharge passage having two traps between which is a space communicating with air-extraction means whereby a flow of flushing water to the bowl extracts air from the said space to initiate or assist the syphonic action, the flushing water entering the basin through an inlet which opens into a flushing chamber in turn communicating with the bowl.

It has been proposed to provide a water-closet basin of the above kind with air-extraction means consisting of an air-pipe projecting rearwardly from, and externally of, the basin and communicating at one end, through a gland device, with the space between the traps and at the other end with an air-extraction aperture in a flush-pipe disposed externally of the basin and supplying water to the inlet to the flushing chamber. Such an arrangement has the disadvantage that it is somewhat difficult to install the external rear air-pipe and to make the necessary airtight joints between this pipe and the basin and flush pipe; and a further disadvantage is that the said rear air-pipe is, owing to its position behind the basin, difficult or inconvenient to clean.

The object of the present invention is to provide a water-closet basin, of the kind referred to, which is of a novel and compact construction enabling the above disadvantages to be avoided and also enabling the cost of the fixture and its installation to be reduced.

According to the invention, a syphonic-discharge water-closet basin of the kind referred to, has an air chamber which is disposed, inside the body of the basin, adjacent the flushing chamber and which communicates with the space between the two traps in the discharge passage, the water inlet for the basin consisting of a pipe or conduit which is adapted to be fitted to, or form a continuation of, a flush pipe disposed externally of the basin, the said water inlet pipe or conduit passing through the air chamber and having an air-extraction aperture or apertures open to said air chamber, whereby a flow of flushing water through the water inlet pipe or conduit causes air to be drawn up from the space between the traps to initiate or assist the syphonic action. Preferably, the air chamber is disposed immediately behind the flushing chamber and has a front opening formed in a partition dividing the air chamber from the flushing chamber, and a rear opening formed at the rear of the basin, the apertured water inlet pipe or conduit being inserted into these front and rear openings and carrying front and rear sealing rings of rubber or like yieldable material respectively engaging the rear surrounds of the front and rear openings to seal the said openings in a fluid-tight manner. The air-extraction aperture, or each air-extraction aperture may be formed by providing a wall of the water inlet pipe or conduit with a slit transverse to the axis of the said pipe or conduit and bowing inwards, the portion of wall, immediately adjacent the said slit, on the upstream side of the latter, to form a hood or cowl inside the pipe or conduit.

Also, according to the invention, a body for a syphonic-discharge water closet basin, of the kind referred to, has formed therein the bowl, the flushing chamber, and an air chamber which is disposed adjacent the flushing chamber, the said air chamber being adapted to receive air extracted from the space between the two traps and to communicate with air-extraction means.

Figure 1 of the accompanying drawings

[*Price 3s. 6d.*]

shows in vertical section, and by way of example, a syphonic-discharge water-closet basin constituting a particular embodiment of the present invention.

Figure 2 is a rear view of the upper portion of the basin shown in Figure 1.

Figure 3 shows a portion of Figure 1 on a larger scale.

Figure 4 is a horizontal section, on the same scale as Figure 3, on the line IV—IV, Figure 3.

Figure 5 is a section on the line V—V, Figure 4, and shows on a larger scale than Figure 4, a detail of the embodiment.

Figure 6 is a vertical section through the rear top portion of the body of the basin shown in Figure 1, but before a water inlet pipe or conduit is inserted in place to complete the basin.

Referring to the drawings, a syphonic-discharge water-closet basin comprises a body 1 having a bowl 2 which is supported upon a pedestal 3 and which communicates at the bottom with a rearwardly-extending discharge passage 4, the said passage being formed in the body 1 and having two traps 5, 6. The said discharge passage 4 rises from the outlet of the bowl 2, so as to provide, in combination with the lower part of the bowl, the first trap 5, and then curves first downwardly, to a point below the level of the bottom of the bowl, and then upwardly to provide the second trap 6, there being, under static conditions, when water in each trap has found its level, an air space 7 in the portion of the passage between the two traps 5, 6. In the embodiment shown the rear end of the passage 4 is directed rearwardly as shown at 4*a*, but if desired the basin body can be formed with the said end directed downwardly as shown in broken lines 4*b*. The basin is provided at the rear, adjacent the top of the bowl 2, and over the rearwardly-extending discharge passage 4, with a flushing chamber 8 opening into a hollow flushing rim 9, the latter extending around the top of the bowl and having apertures 10 adapted to direct streams of water down on to the inside of the bowl. The said flushing chamber 8 is provided adjacent its base with a forwardly-directed after-flush outlet 11 through which water can flow into the bowl to fill the traps after the flushing operation. Also disposed at the rear of the basin, and at the top thereof and over the discharge passage 4, but immediately behind the flushing chamber 8, is an air chamber 12 communicating, through an air passage 13 formed in its base, with the aforesaid air space 7 between the two traps in the discharge passage, the said air passage 13 in the base of the air chamber 12 opening directly into the said air space 7. The said air chamber 12, and the air passage 13 between the latter and the air space, are disposed, with the flushing chamber 8, inside the body 1 of the basin.

The air chamber 12 is divided from the flushing chamber 8 by a partition 14, and is provided with aligned circular front and rear openings 15, 16, in the partition 14 and in a rear wall (shown at 17) of the body, respectively. Inserted through these openings 15, 16, is a circular-sectioned metal inlet pipe or conduit 18 for flushing water, the said pipe or conduit 18 passing through the air chamber 12 and projecting forwardly, through the front opening 15 in the air chamber, into the flushing chamber 8 and having an open front end 18*a* disposed in the said flushing chamber. The other end of this pipe or conduit 18 projects rearwardly through the rear opening 16 in the air chamber 12 and has an exterior rear portion 18*b* externally threaded at 19, and adapted to be detachably connected to an external flushing pipe (not shown) leading from the cistern. The front end rear openings 15, 16 in the air chamber 12 are sealed in a fluid-tight manner by means of front and rear sealing rings 20, 21 of rubber or like yieldable material carried by the inlet pipe or conduit 18 and respectively engaging the rear surrounds 22, 23 of the said front and rear openings in the air chamber. The inlet pipe or conduit 18 is held in place by an integral external attachment part 24 secured against the rear of the basin body by screws 25.

The said inlet pipe or conduit 18 is provided, inside the air chamber 12, with three air-extraction apertures 26 open to the said air chamber 12, each aperture 26 being formed by slitting the pipe or conduit wall along part of its circumference and bowing inwards the portion of wall immediately behind the said slit to form a small hood or cowl 27 inside the pipe or conduit. The arrangement is such that a forward flow of water along the inlet pipe or conduit 18 during the flushing operation causes air to be drawn from the air chamber 12 into the said pipe or conduit 18, the air being deflected forwardly into the pipe or conduit 18 by the hoods or cowls 27 adjacent the air-extraction apertures 26.

When the bowl of the above-described basin is flushed, the water from the exterior flushing pipe passes through the apertured inlet pipe or conduit 18 and then into the flushing chamber 8, from which it passes into the bowl through the apertures 10 in the flushing rim. This flow of water through the apertured inlet pipe or conduit 18 draws air from the air chamber 12 into the said pipe or conduit, as stated above, and this results in air being extracted from the space 7 between the two traps, thereby initiating or assisting the syphonic action, the said extracted air passing into the air chamber 12 through the air passage 13 between the latter and the syphonic discharge passage.

The above-described basin is of a compact construction and no exterior air-pipe is required. The basin is easier to install, and the rear exterior part of the basin is easier to keep clean than would be the case if an exterior air-pipe had to be provided.

If desired, instead of the water inlet pipe or conduit 18 having three apertures 26, one, two or more than three such apertures may be provided in the said pipe or conduit.

The water inlet pipe or conduit may, if required, form an integral continuation of the flushing pipe, instead of being detachably connected thereto. Or, instead of being a metal fitting inserted into the body of the basin the water inlet pipe or conduit may be of pottery and be formed integral with the material of the said basin body.

What we claim is:—

1. A syphonic-discharge water-closet basin, of the kind referred to, having an air chamber which is disposed, inside the body of the basin, adjacent the flushing chamber and which communicates with the space between the two traps in the discharge passage, the water inlet for the basin consisting of a pipe or conduit which is adapted to be fitted to, or form a continuation of, a flush pipe disposed externally of the basin, the said water inlet pipe or conduit passing through the air chamber and having an air-extraction aperture or apertures open to the said air chamber, whereby a flow of flushing water through the water inlet pipe or conduit causes air to be drawn up from the space between the traps to initiate or assist the syphonic action.

2. A syphonic-discharge water-closet basin according to Claim 1, wherein the air chamber is disposed immediately behind the flushing chamber and has a front opening formed in a partition dividing the air chamber from the flushing chamber, and a rear opening formed at the rear of the basin, the apertured water inlet pipe or conduit being inserted into these front and rear openings and carrying means to seal in a fluid-tight manner the said front and rear openings.

3. A syphonic-discharge water-closet basin according to Claim 2, wherein the means to seal the said front and rear openings comprise front and rear sealing rings of rubber or like yieldable material carried by the apertured water inlet pipe or conduit and respectively engaging the rear surrounds of the front and rear openings.

4. A syphonic-discharge water-closet basin according to Claim 3, wherein the air-extraction aperture, or each air-extraction aperture, is formed by providing a wall of the water inlet pipe or conduit with a slit transverse to the axis of the said pipe or conduit and bowing inwards the portion of wall immediately adjacent the said slit, on the upstream side of the latter, to form a hood or cowl inside the pipe or conduit.

5. A syphonic-discharge water-closet basin according to Claim 1, wherein the apertured water inlet pipe or conduit is formed integral with the material of the body of the basin.

6. A body for a syphonic-discharge water closet basin of the kind referred to, the said basin body having formed therein the bowl, the flushing chamber, and an air chamber which is disposed adjacent the flushing chamber, the said air chamber being adapted to receive air extracted from the space between the two traps and to communicate with air extraction means.

7. A body for a syphonic-discharge water-closet basin, according to Claim 6, wherein the air chamber has openings into which a given water-inlet pipe or conduit can be inserted so that it passes through the air chamber and communicates with the flushing chamber, and so that an air-extraction aperture or apertures in the said pipe or conduit are open to the air chamber.

8. A body, for a syphonic-discharge water-closet basin, according to Claim 7, wherein the air chamber is disposed immediately behind the flushing chamber and has front and rear openings through which the given water-inlet pipe or conduit can be inserted, the front opening being formed in a partition dividing the air chamber from the flushing chamber and the rear opening being formed at the rear of the basin body.

9. A syphonic-discharge water-closet basin, substantially as herein described with reference to Figures 1 to 5 of the accompanying drawings.

10. A syphonic-discharge water-closet basin body, substantially as herein described with reference to Figure 6 of the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements relating to Syphonic-Discharge Water-Closet Basins

We, Twyfords Limited, a British Company, of Cliffe Vale Potteries, Newcastle Road, Hanley, Stoke-on-Trent, Staffordshire, do hereby declare this invention, to be described in the following statement:—

This invention relates to syphonic-discharge water-closet basins of the kind comprising a bowl provided with a discharge passage having two traps between which is a space communicating with air-extraction means whereby a flow of flushing water to the bowl extracts air from the said space to initiate or assist the syphonic action, the flushing water entering the basin through an inlet which opens into a flushing chamber in turn communicating with the bowl.

It has been proposed to provide a water-closet basin of the above kind with an air-extraction means consisting of an air-pipe projecting rearwardly from, and externally of, the basin and communicating at one end, through a gland device, with the space between the traps and at the other end with an air-extraction aperture in a flush-pipe disposed externally of the basin and supplying water to the inlet to the flushing chamber. Such an arrangement has the disadvantage that it is somewhat difficult to instal the external rear air-pipe and to make the necessary airtight joints between this pipe and the basin and flush pipe; and a further disadvantage is that the said rear air-pipe is, owing to its position behind the basin difficult or inconvenient to clean.

The object of the present invention is to provide a water-closet basin, of the kind referred to, which is of a novel and compact construction enabling the above disadvantages to be avoided.

According to the invention, a syphonic-discharge water-closet basin, of the kind referred to, has an air chamber which is disposed, inside the body of the basin, adjacent the flushing chamber and which communicates with the space between the two traps in the discharge passage, the water inlet for the basin consisting of a pipe or conduit which is adapted to be fitted to, or to form a continuation of, an external flush pipe and which passes through the air chamber, the said pipe or conduit having, inside the air chamber, an air-extraction aperture or apertures open to the said air chamber, whereby a flow of flushing water through this inlet pipe causes air to be drawn up from the space between the traps to initiate or assist the syphonic action. Preferably, the air chamber is disposed immediately behind the flushing chamber and has front and rear openings through which the aforesaid apertured pipe or conduit is inserted, the said pipe or conduit projecting, from the front opening in the air chamber, into the flushing chamber, and the pipe or conduit carrying means to seal in a fluid-tight manner the said front and rear openings in the air chamber.

Also, according to the invention, a syphonic-discharge water-closet basin, having a flushing chamber and having a discharge passage with two traps separated by an air space, is provided with an air chamber formed in the body of the basin and disposed at the rear of the latter, the said air chamber being separated, or being adapted to be separated, from the flushing chamber and being in communication with the air space between the two traps in the discharge passage.

Thus, in carrying out a convenient embodiment of the invention a syphonic-discharge water-closet basin comprises a pedestal supporting a bowl provided at the bottom with a rearwardly-extending discharge passage having two traps. The said discharge passage rises from the outlet of the bowl, so as to provide, in combination with the lower part of the bowl, the first trap, and then curves first downwardly, to a point below the level of the bottom of the bowl, and then upwardly, to provide the second trap, there being, under static conditions when water in each trap has found its level, an air space in the portion of the passage between the two traps. The basin is provided at the rear, adjacent the top of the bowl, and over the rearwardly-extending discharge passage, with a flushing chamber opening into a hollow flushing rim, the latter extending around the top of the bowl and having apertures adapted to direct streams of water down on to the inside of the bowl. The said flushing chamber is provided adjacent its base with a forwardly-directed after-flush outlet through which water can flow into the bowl to fill the traps after the flushing operation. Also disposed at the rear of the basin, and at the top thereof and over the discharge passage, but immediately behind the flushing chamber, is an air chamber communicating, through an air passage formed in its base, with the aforesaid air space between the two traps in the discharge passage, the said air passage in the base of the air chamber opening directly into the said air space. The said air chamber, and the air passage between the latter and the air space, are disposed, with the flushing chamber, inside the body of the basin.

The air chamber is provided with aligned circular front and rear openings through which a circular-sectioned metal inlet pipe or conduit for flushing water is inserted, the said pipe or conduit passing through the air chamber and projecting forwardly, through the front opening in the air chamber, into the flushing chamber and having an open front end disposed in the said flushing chamber. The other end of this pipe or conduit projects rearwardly through the rear opening in the air chamber and has an exterior rear portion adapted to be detachably connected to an external flushing pipe leading from the cistern. The front and rear openings in the air chamber are sealed in a fluid-tight manner by means of front and rear rubber sealing rings carried by the inlet pipe or conduit and respectively engaging the surrounds of the said front and rear openings in the said air chamber. The inlet pipe or conduit is held in place by an integral external attachment flange or plate secured against the rear outside face of the basin, adjacent the rear opening of the air chamber, by bolts or screws.

The said inlet pipe or conduit is provided, inside the air chamber, with one or more (for example, two or three) air-extraction apertures open to the said air chamber, the aperture, or each aperture, being formed by slitting the pipe or conduit wall along part of its circumference and bowing inwards the portion of wall immediately behind the said slit to form a small hood or cowl inside the pipe or conduit. The arrangement is such that a forward flow of water along the inlet pipe or conduit during the flushing operation causes air to be drawn from the air chamber into the said pipe or conduit, the air being deflected forwardly into the pipe or conduit by the hood or cowl adjacent the air-extraction aperture, or each such aperture. The interior of the inlet pipe or conduit is, in the embodiment being described, provided with a venturi restriction rearwards of the hood or cowl, or hoods or cowls.

When the bowl of the above-described basin is flushed, the water from the exterior flushing pipe passes through the apertured inlet pipe or conduit and then into the flushing chamber, from which it passes into the bowl through the apertures in the flushing rim. This flow of water through the apertured inlet pipe or conduit draws air from the air chamber into the said pipe or conduit, as stated above, and this results in air being extracted from the space between the two traps, thereby initiating or assisting the syphonic action, the said extracted air passing into the air chamber through the hereinbefore-mentioned air passage between the latter and the syphonic discharge passage.

The above-described basin is of a compact construction, and since no exterior air-pipe is required, the basin is easier to instal and the rear exterior part of the basin is easier to keep clean.

In a modification, the inlet pipe or conduit passing through the air chamber comprises two integral and co-axial portions, namely a front portion, which passes through the front opening in the air chamber and has a rear end of enlarged diameter, and a rear portion which passes through the rear opening in the air chamber and has a reduced-diameter front end, the said reduced front end of the pipe rear portion projecting into, and being spaced from, the enlarged rear end of the front portion of the pipe, the said front portion of the pipe being joined to the rear portion of the pipe rearwards of the said projecting reduced end, and the arrangement providing the pipe, between the wall of the enlarged end and the wall of the reduced end, with an annular interior pocket opening forwardly into the front portion of the pipe. The outer wall of this pocket, that is the wall of the enlarged rear end of the front pipe portion, is provided with radially-presented slots constituting air-extraction apertures open to the air chamber, so that when flushing water flows through the inlet pipe, air is drawn, from the air chamber, and through the said slots, into the annular interior pocket, and is thence carried forwards along the pipe.

If, desired, instead of the inlet apertured air inlet pipe or conduit being detachably connected to the external flushing pipe leading from the cistern, it may form an integral continuation of said external flushing pipe.

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2 SHEETS

COMPLETE SPECIFICATION
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Sheets 1 & 2

Fig. 1.

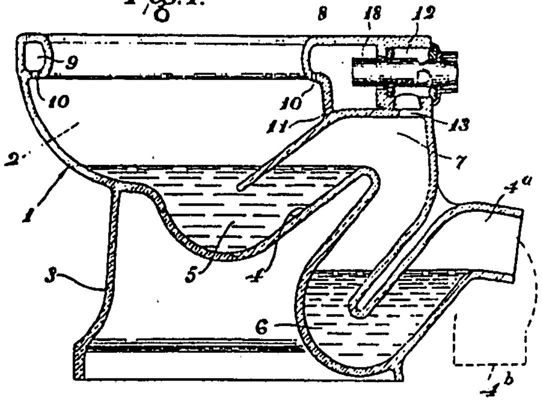


Fig. 2.

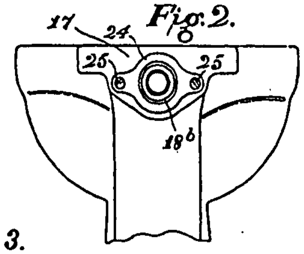


Fig. 3.

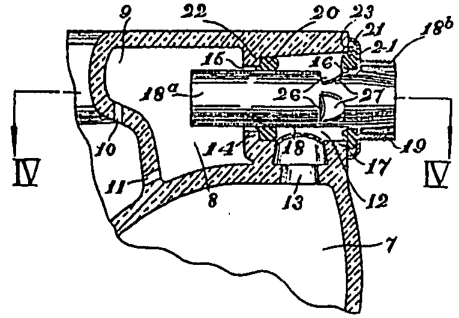


Fig. 4.

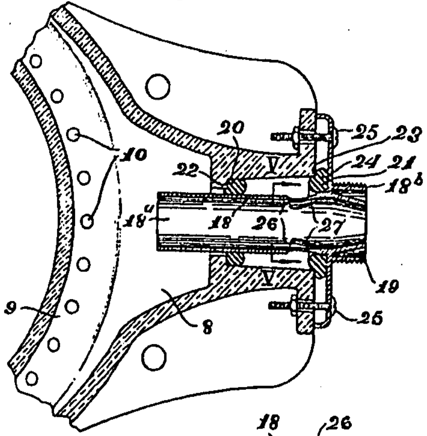


Fig. 5.

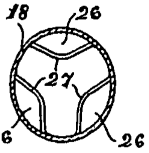
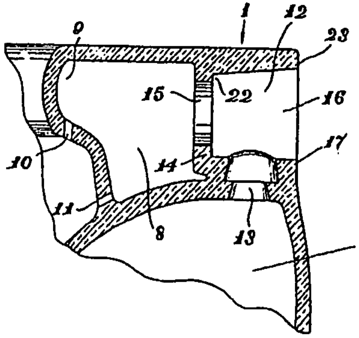


Fig. 6.



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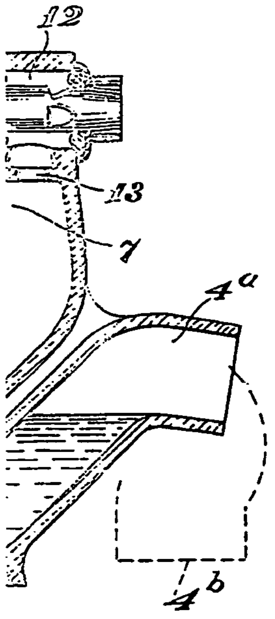

Fig: 4.

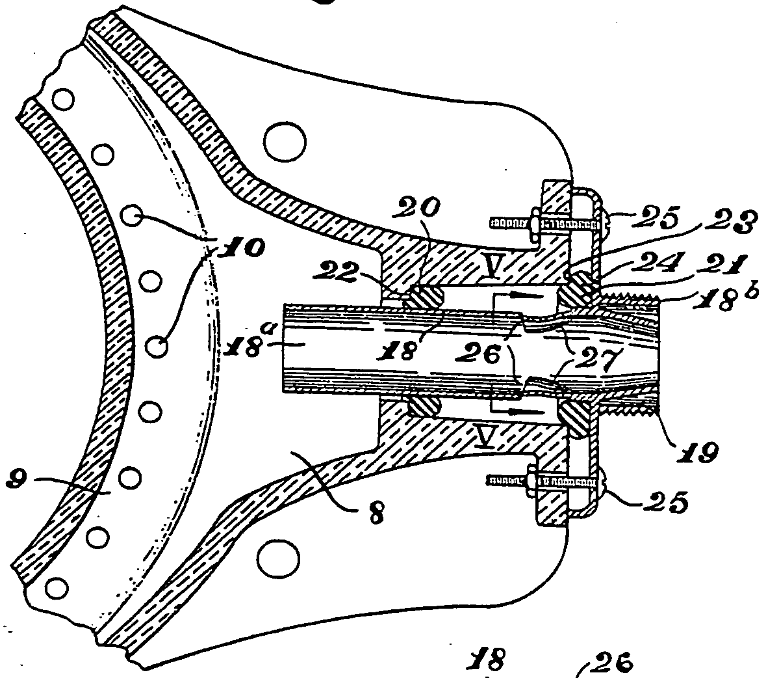

Fig: 5.

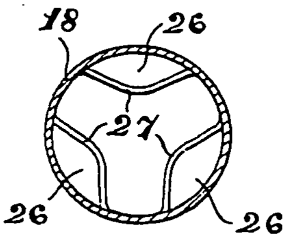

Fig: 6.